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WASHINGTON LETTER.

WASHINGTON, December 20, 1892.

VARIATION OF LATITUDE.—At the instigation of the International Geodetic Association, observations have been in progress for the last three years at several locations in the northern hemisphere for the purpose of inquiring into the supposed variation of the geographical latitude, and for investigating its laws of change.

The assistance afforded by the United States Coast and Geodetic Survey for the elucidation of the phenomenon consists in the occupation of three stations, at which latitude observations were to be made over a space of at least one year. These stations were Rockville, Md. (near Washington), San Francisco, California, and Waikiki (near Honolulu), Hawaiian Islands.

The observations at Rockville (Washington), made by Assistant Edwin Smith, have been reduced and discussed by Prof. Charles A. Schott, who says that the results of the astronomical observations specially made for the last three years leave no further doubt of the fact that the longitude of a place is slightly variable. "The phenomenon, as deduced from observations in Europe, in North America, and the Hawaiian Islands indicates a periodic variation such as would be produced by the revolution of the axis of rotation about that of the earth's figure."*

* U. S. C. & G. S. Bulletin No. 25.

Mr. Smith gives an interesting description of the station at Rockville, and the instruments and methods of observing.

The results of the work of Assistant E. D. Preston, at Waikiki, and of Assistant George Davidson, at San Francisco, will soon be ready for publication.

GEOGRAPHIC NAMES.—The United States Board on Geographic Names has issued no bulletin during the past year. The forthcoming annual report will probably contain no new information, but be simply a progress report. A dictionary of Alaskan geographical nomenclature, accompanied by maps showing the location of the names, is one of the possibilities of the future. There is a large amount of valuable material available for this purpose.

NEW GEOGRAPHY.—Mr. Johnson Nickens, U. S. Consul at Barranquilla, in the September issue of the *Reports from Consuls of the United States*, describes the great Magdalena River, which extends 1,000 miles through the best portion of the Republic of Colombia, draining an estimated area of 110,000 square miles. The tributaries and islands of the Magdalena, its natural history, towns, cities, lands and woods, products, commerce and public works are sketched in a manner both entertaining and instructive.

In the same publication Mr. Philip Carroll, Consul at Demerara, presents the best recent account of the inhabitants and industries of British Guiana. Most people will be surprised at the possibilities of this tropical country. Mr. Carroll gleaned much from conversations

with gentlemen of the colony, and used such opinions rather than his own. He concludes that the colored race of the colony is different from the colored race in the United States, and not at all comparable to the latter, although he has met lawyers, doctors and editors who will compare favorably with many and excel some of their brethren of the white race in the same vocations there or elsewhere.

He describes nearly one hundred varieties of elegantly colored woods, suitable for furniture and house trimmings, which would be appreciated in other parts of the world if better known.

In his "Investigation of the Coast Waters of South Carolina with reference to oyster-culture," Mr. John D. Battle, who was formerly associated with Lieut. Francis Winslow, U. S. Navy, in a similar survey of North Carolina, describes with corresponding particularity and accuracy the numerous coast streams of South Carolina. The coast region of South Carolina consists chiefly of very low country, which in many places extends inland a considerable distance. It is indented or cut through by a number of sounds, bays and river mouths, which are connected by an intricate system of winding creeks and rivers, separating the sea islands from one another and from the mainland. The intricacy of the system will be appreciated when it is stated that the investigations extended over seventy-one streams within the comparatively narrow region of this coast country. Six maps based on Coast Survey explorations accompany the report, which will be part of the next Bulletin of the U. S. Fish Commission.

Mr. Thomas J. Vivian, of the Census Bureau, has

formulated some new geographical work, in a report on the "Rivers of the Mississippi Valley," describing with considerable detail the numerous tributaries of the three great streams—the Mississippi, the Missouri and the Ohio.

MINERAL PRODUCTS.—A highly important chart, exhibiting the mineral products of the United States for the calendar years between 1880 and 1891, has recently appeared. It was prepared by Dr. David T. Day, Chief of the Division of Mining Statistics of the United States Geological Survey, and Special Agent of the Census Bureau in charge of mines and mining. It will be a surprise to everybody to find that the phenomenal product of 1890, which was over \$69,000,000 more than 1889, was kept up and even slightly surpassed in 1891, in spite of the Baring Bros. disaster, which undoubtedly kept the mineral product from a significantly greater increase. It goes to show that something like \$650,000,000 of mineral products can be counted on as about the standard output of the present time; that even a slight pushing of the product will put it beyond \$700,000,000, and that a product of less than \$650,000,000 means some significant depression in the mining industry. The exact total product of 1891 was \$668,524,537, of which \$356,216,615 was non-metallic—(value at the point of production)—\$302,307,922 metallic, and \$10,000,000 unspecified.

Few people are aware of the enormous development of the mineral resources of the country during the last decade. In 1881 the value was about \$400,000,000, and did not exceed \$500,000,000 until 1887. The year

1890 showed an increase of nearly \$100,000,000 over 1889, and the year 1891 distanced the previous year by over \$10,000,000; indicating for both years the phenomenal prosperity of the country.

While the development has been general all along the line, several instances are quite phenomenal. Asphaltum for instance, yielded but \$8,000 in 1881, but in 1891 the output had increased in value to \$242,264. Mineral paints rose from \$100,000 in 1881 to \$658,478 in 1891. The product of natural gas was first reported in 1882 at \$215,000. In 1891 it had risen to \$18,000,000, which was a slight decrease from, the previous year. Aluminum was first reported in 1883 at \$875. In 1891 the value was \$100,000. The copper product was valued at \$12,000,000 in 1881, and \$38,000,000 ten years later. The yield of silver nearly doubled, while that of gold was slightly less.

Not less interesting are the inverse developments of other industries. The product of nickel, for instance, yielded but \$71,000 in 1891; while in 1881 it was \$292,000. Millstones descended the scale from \$150,000 (1881) to \$16,587 (1891); Mica, from \$250,000 to \$100,000; while marls, which were valued at \$500,000 in 1881, are threatened with extinction.

Dr. Day has outstripped all his associates in the Census Bureau by weeks (and perhaps by months) in completing the first of the final reports of the Census of 1890. This result is due not only to his own zeal and skilful management, but to the high character and efficiency of the several specialists who were his collaborators. Charles Kirchoff, editor of *Iron Age*, treated of copper, lead and zinc. John Birkenbine, an expert

in furnace construction, held "Iron Ores." Richard P. Rothwell, editor of the *Engineering and Mining Journal*, produced the most reliable statement of the product of gold and silver yet published in this country. His work has been separately published by the *Scientific Publishing Company of N. Y.* Only a brief statement of the results has been published in advance of the complete report, and practically nothing of the detailed tables and the comparisons of the product with previous years and with foreign countries. James Butterworth Randal, a recognized authority in the collection of quicksilver statistics, had charge of that field and carried the work through in spite of severe illness. Dr. Charles A. Ashburner, formerly of the Second Geological Survey of Pennsylvania and also of the U. S. Geological Survey, and John H. Jones were jointly assigned to the coal inquiry. Dr. Ashburner died before the work had well begun. Dr. William C. Day had a very difficult subject to treat—that of stone production; but his work was ready for publication in advance of all the others.

Joseph D. Weeks, editor of the *American Manufacturer and Iron World*, assumed charge of reports on petroleum, natural gas and manganese. Mr. Weeks is also high authority on coke and glass industries. To Mr. George F. Kunz, of New York, was assigned a branch of inquiry not attempted in any previous census—a statistical compilation of the finds of precious stones. There are few regular mines for precious stones in this country, and the work of tracing the occasional finds of gems, amounting in all to a considerable total value, is one which must be tried to be appreciated. Mr.

Kunz (of Tiffany & Co.) is the author of the celebrated "Gems and Precious Stones of North America." The aluminum industry has arisen since the census of 1880. It is, therefore, for the first time treated in the present volume by Mr. R. L. Packard. The industry of producing and selling mineral waters is also for the first time treated in the Census reports, by Mr. Albert C. Peale. All the statistics of precious metals and other minerals, except quicksilver, of California were collected by Charles G. Yale, editor of the *Mining and Scientific Press*.

Some of the most interesting features of the Census report of 1880 have been omitted entirely in 1890. The inquiry has been limited to an enumeration of the productive mining establishments of the country, the amount and value of their products, the number of persons who obtained a livelihood by these industries, the total amount received as wages by these employés, the number of days in a year on which they received steady employment, and the principal items of capital concerned in mining operations. Topics relating to accidents in mining, details of materials used, and everything in regard to mining methods were abandoned. Dr. Day claims that abundant experience has shown that complete technical statements for all branches of the mining industry are out of the limits of time for a census. Consequently only those lines of work were selected which could not easily be carried out by any other agency than a national census.

Probably no census feature has been so well described graphically as the railway mileage of the world in 1890. Mr. Henry C. Adams makes a most interest-

ing exhibit of the subject in *Extra Census Bulletin*, No. 24. There are seven pages only of text; but the seven diagrams and one base map exhibit (1) Railway mileage of the world by countries. (2) Miles of railway per 100 square miles by countries. (3) Miles of railway per 10,000 inhabitants by countries. (4) Railway mileage of the United States, 1830 to 1890, by territorial groups. (5) Railway mileage in the United States per 100 square miles of territory, 1830 to 1890. (6) Railway mileage in the United States per 10,000 inhabitants, 1830 to 1890. (7) Railway mileage of the United States by territorial groups. In 1830, when many now living were young men, there were less than forty miles of railways in the country. In 1840 there were about 2800; in 1850 not more than 8771; in 1860 the number had swelled to 28,919; in 1870 to 49,168 miles; in 1880 to 87,724, while 1890 gives the astonishing total of 163,597 miles, which is 44.18 per cent. of the whole mileage of the world, and exceeds by 3942 miles the entire mileage of Europe, Asia and Africa. It rarely occurs that so much information is so lucidly and accurately afforded in such brief space as in this Bulletin.

BERING SEA ARBITRATION.—The questions to be decided by the arbitrators soon to meet in Paris are:

What exclusive jurisdiction in the sea known as the Bering Sea, and what exclusive rights in the seal fisheries therein, did Russia assert and exercise prior and up to the time of the cession of Alaska to the United States?

How far were these claims of jurisdiction as to the

seal fisheries recognized and conceded by Great Britain?

Was the body of water known as the Bering Sea included in the phrase "Pacific Ocean" as used in the treaty of 1825 between Great Britain and Russia, and what rights, if any, in the Bering Sea were held and exclusively exercised by Russia after said treaty?

Did not all the rights of Russia as to jurisdiction and as to the seal fisheries in Bering Sea east of the water boundary in the treaty between the United States and Russia of the 30th of March, 1867, pass unimpaired to the United States under that treaty?

Have the United States any right, and if so, what right, of protection of property in the fur seals frequenting the islands of the United States in Bering Sea when such seals are found outside of the ordinary three-mile limit?

The tribunal is composed of seven arbitrators, and from its decision there is no appeal. On the part of the United States there are two arbitrators, Hon. John T. Morgan, of Alabama, and Justice John M. Harlan, of Kentucky. On the part of Great Britain, two; the Right Honorable Lord Hannen, of England, and Sir John S. D. Thompson, of Canada. On the part of France, Baron de Courcel; Italy, Marquis Emilio Visconti Venosta; Sweden-Norway, G. W. W. Gram. Hon. John W. Foster, the Secretary of State, will be the official agent of the United States, and Mr. C. H. Tupper, of Canada, that of Great Britain. The counsel on the part of the United States are Henry W. Blodgett, of Chicago, Edward J. Phelps, of Vermont, and James C. Carter, of New York. In addition, Thomas

Corwin Mendenhall, of the Coast Survey, Dr. C. Hart Merriam, Naturalist of the Department of Agriculture, Sir George Baden-Powell, M.P., and Professor George Mercer Dawson, director of the Canadian Geological Survey, are retained as special commissioners by the United States and Great Britain respectively, in the case of a certain contingency.

The decision in the controversy will determine for all time the control of a very large sea, and fisheries of incalculable value. The attention of the whole world will be drawn to the deliberations and conclusions of this high commission.

The tribunal will assemble on the 23d of February next. Data, facts and arguments on both sides have been assiduously gathered on every point, and the case, counter case and arguments are near the state of completion. The conclusions of the tribunal are looked for in July or August, 1893.

The dispute about to be settled originated only seven years ago (1885), when the seal-poaching craze first broke out among the Canadians. In 1886, one American and three Canadian schooners were seized for poaching. In 1887 a larger number were seized, and in 1888 the seizures were stopped pending propositions for arbitration. In 1889 seizures were resumed by United States cutters, and since then by both American and British cutters, although it is stated that more poaching and destruction of seals has taken place in that period than ever before; that from 350,000 seals annually destroyed not more than 55,000 skins have been taken each year.

NICARAGUA CANAL—PROGRESS OF CONSTRUCTION.—The work of actual construction was inaugurated October 8, 1889. The necessity of a safe entrance from the Atlantic required the restoration of the harbor of San Juan del Norte. To this end a massive breakwater has been pushed out about 1000 feet. A railroad track has been laid to facilitate the handling of building material and other supplies. With the construction of this breakwater the sand spit that thirty years ago closed the old port of San Juan disappeared, without the assistance of any dredge or other artificial aid; and where six months before there was a sand bank 3 or 4 feet above the sea level there was in the winter of 1890-91 a depth of water of about 15 feet, which has since been maintained. The first deep-sea vessel to enter the restored harbor was the *Sverdrup* with a cargo of machinery.

Permanent structures for headquarters, hospital, camp etc., covering 75,902 square feet, have been erected in the immediate vicinity of San Juan, also, extensive wharves, and tramways.

The canal line has been cleared of forest growth for a distance of ten miles back from the coast, and for nine miles on the west side of Lake Nicaragua. This clearing is 486 feet in width.

A telegraph line to the interior connecting with the telegraph system of the country and with ocean cables, and covering a distance of sixty miles, has been completed. To protect this line from damage by falling timbers it was necessary to make a clearing of the forest along the line to a width of about 100 feet.

The rock-cutting of "The Eastern Divide"—the heaviest single body of work to be accomplished on the

whole line of the canal, required the construction of a railroad through impassable swamps, for transporting machinery, etc. Eleven miles of this road have been constructed and equipped, and but seven miles now remain to be built to reach the Eastern Divide. The railroad line between Lake Nicaragua and the Pacific is also located and made ready for construction.

Dredging on the canal line west of the harbor of San Juan del Norte has been uninterruptedly carried forward, and a mile of channel excavated 17 feet deep and varying in width from 150 to 230 feet. This has been accomplished by the purchase and use of the extensive and valuable plant formerly used on the eastern end of the Panama canal.

Nearly all the skilled employés have been hired in the United States. Natives of Central America and negroes from Jamaica have been employed for unskilled labor. The employés are housed, fed, and supplied with medicine and hospital attendance by the company. No Chinese or other Asiatic workmen are employed.

No change in the location of the line of the canal first decided upon has been made except in one instance, where it has been discovered that a curve may be eliminated with a saving in excavation of upwards of 600,000 cubic yards, and in distance of 1000 feet.

Medical organization and the system of sanitation have proved exceedingly valuable in maintaining a death rate greatly below that of any other known large work of construction; in fact, below the death rate of hospitals in the United States, the difference being, as between the Roosevelt Hospital, New York, and the Nicaragua hospital, 8.38 per cent. in favor of the latter. Chagres fever is entirely unknown, and most of the diseases met

with have been mild in type. The mean temperature during 1890 was 77.25° ; during 1891 the mean was 81° .

The work accomplished to date may therefore be summarized as follows:

(1) The prosecution of the final surveys for location and construction and surveys for economical improvements as to details.

(2) The subterranean examinations of the strata requiring removal by means of boring with the diamond drill.

(3) The restoration of the harbor of San Juan del Norte to the extent of securing an easy entrance to the port for vessels of moderate draft.

(4) The construction of extensive wharves and landing facilities.

(5) The erection of permanent buildings for offices, quarters, hospitals, storehouses, shops, etc., having a floor area of an acre and three-fourths.

(6) The building of a large number of temporary camps along the line for accommodation of employes.

(7) The completion of a telegraph line permitting ready communication with the work.

(8) The clearing of the canal line of timber for some 20 miles.

(9) The completion of surveys for location and of plans for construction of the railroad system, and the construction and equipment of 11 miles of this line.

(10) The acquisition by purchase of the most valuable and powerful dredging plant to be found in America under one management.

(11) The fitting up and operation of this plant and the opening of over a mile of the canal.

(12) The acquirement by purchase of the valuable and exclusive franchise for the steam navigation of the San Juan River and Lake, together with the extensive plant of the Navigation Company, consisting of offices, lands, steamboats, tugs, lighters, repair shops, etc.

(13) And lastly, what is felt to be the most important result of all is the demonstration, secured by experience, of the salubrity of the climate, the efficiency of labor, and the sufficiency of the estimates of the chief engineer for the harbor and canal dredging and railroad work.

The government of Nicaragua, by a communication dated November 8, 1890, has officially recognized and declared that the Company has more than complied with the provisions of article 47 of the concession, requiring the expenditure of \$2,000,000 during the first year of the work. This formal acknowledgment confirms the Company's title to the concessionary rights for a term of ten years in which to complete the canal.

A detailed description of the proposed canal and the work to be accomplished in its construction, together with the maps showing the route thereof as the same has been finally located, was annexed to the annual report of the Company for the year 1890.

Favorable action by Congress on matters affecting the interests of this undertaking will guarantee beyond question the completion of the most important American enterprise of the century.

H.